

PUGET SOUND NAVAL SHIPYARD, PATTERN SHOP
(Puget Sound Naval Shipyard, Bldg. No. 59)
Farragut Avenue
Bremerton
Kitsap County
Washington

HAER No. WA-116-A

HAER
WASH
18-BREM,
4A-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Western Region
Department of the Interior
San Francisco, California 94107

HISTORIC AMERICAN ENGINEERING RECORD

HAER
WASH
18-BREM,
4A-

PUGET SOUND NAVAL SHIPYARD, PATTERN SHOP
(Puget Sound Naval Shipyard, Bldg. No. 59)

HAER No. WA-116-A

Location: On Farragut Avenue; bounded on the west by State Highway 304 and Montgomery Avenue, on the north by First Street, Gregory Way, and Burrell Street, on the east by Pacific Avenue and Sinclair Inlet, on the south by Sinclair Inlet; Puget Sound Naval Shipyard, Kitsap County, Bremerton, Washington.

USGS Bremerton West (1:24,000); Universal Transverse Mercator Coordinates: Easting 527865 and Northing 5267700.

Date of Construction: 1896.

Engineer: Unknown.

Builder: Designed by the Bureau of Yards and Docks, USN.

Present Owner: U. S. government, administered by the Department of Defense/U. S. Navy, Bremerton, Washington.

Present Use: Pattern Shop.

Significance: Constructed in 1896, the Pattern Shop (Building 59) is one of the earliest extant buildings in the industrial section of the Shipyard. The Pattern Shop represents a distinctive building style of the period designed by the Navy's Bureau of Yards and Docks. The building's heavy brick masonry walls with neo-Renaissance/classical detailing and steel trussed gable roof is typical of industrial structures built in the Shipyard at the turn of the century. A functioning pattern shop since 1910, Building 59 became an essential element of the World War II ship repair/building activity at the Shipyard. The patterns and molds developed in the shop were significant in expediting the repair of ships damaged during the attack on Pearl Harbor and the entire Pacific campaign.

Report Prepared By:

David W. Harvey
Architectural Historian
1344 Hunt Avenue
Richland, Washington 99352

Date: February 1994

INTRODUCTION

This documentation project was prepared in response to the Environmental Assessment (EA) for the Submarine Recycling Program at Puget Sound Naval Shipyard. The project qualified for a Categorical Exclusion from the National Environmental Policy Act (NEPA) in all respects, except that the project required demolition of one contributing structure, Building 59, within a nationally registered Historic Landmark District.

Building 59 is in non-compliance with life, safety and seismic codes, and the cost to bring the building into compliance is considered prohibitive. The south two-thirds of Building 59 is in poor structural condition having suffered damage (extensive cracking of masonry bearing walls) in the 1949 and 1965 earthquakes. The poor condition of the mortar is allowing extensive moisture penetration into the building.

The Shipyard claims it has no further use of the building. There are no other industrial needs which could use the space. Leasing of the building for non-Shipyard use is not feasible due to the building's location in the middle of the industrial area.

The land occupied by the building will be used as a staging or laydown area for the submarine recycling program. Current industrial uses of Building 59 can be accommodated in an existing underutilized industrial structure.

The loss of Building 59 will have an adverse effect (36 CFR 800.9b.1) on the Shipyard's National Historic Landmark District. The Pattern Shop has a high level of national historic significance due to its association with the events of the development of the Shipyard and the participation of the Shipyard in World War II in the Pacific. Since Building 59 has retained much of its integrity of design and function, it is valuable for its interpretive content and contribution to a sense of time and place in American naval and engineering history, and is representative of the turn-of-the-century heavy brick masonry industrial buildings in the Shipyard.

The Shipyard completed the required consultation with the Washington State Office of Archaeology and Historic Preservation, and the National Park Service, per Section 106 of the National Historic Preservation Act. To mitigate this adverse effect the U. S. Navy recommended a Historic

American Engineering Record (HAER) documentation in accordance with National Park Service requirements.

This documentation was administered by the U. S. Army Corps of Engineers, Seattle District, under the supervision of Horace Foxall, District Historian, and Kira Khadem, Preservation Officer for the Puget Sound Naval Shipyard. The work for recording and researching Building 59 was conducted between October 20, 1993 and January 30, 1993, by Florence Lentz, project manager, David Harvey, project historian and author, and John Stamets, project photographer.

HISTORICAL BACKGROUND

Founding of Puget Sound Naval Shipyard

The Puget Sound Naval Shipyard was founded in 1891, two years after the Naval Act of 1889 signaled a new departure in American naval policy through the construction of a sea-going battleship fleet. The fleet was instrumental in the acquisition and protection of America's overseas possessions. To build and repair naval ships the United States established bases and ship repair facilities overseas and domestically. One of the first on the West Coast was the Puget Sound Naval Shipyard in Bremerton, Washington.

From the outset the most important aspect of the Shipyard was its ship repair facilities, or industrial yard. The completion of Drydock No. 1 in 1896, and subsequent ship repair facilities, was extremely important as it made the Shipyard the only base on the West Coast with the capacity to repair America's growing Pacific battleship fleet. As early as World War I the Shipyard possessed the major components required of a naval shore facility, including the fabrication and assembly of the structural components, and pattern making and foundry capacities (Buildings 59 and 147).

Building 59

In 1896 Building 59 was constructed as a storehouse. In 1910 the Pattern Shop was established in the building, consolidating the two pattern shops that had been functioning separately under the Bureau of Construction & Repair and Bureau of Steam Engineering. Prior to consolidation one of the pattern shops was located in a

small, nearby wooden structure, while other patterns were manufactured in the galley of the Machine Shop.

The location of the Pattern Shop, opposite Drydock #1 and south of the Foundry, indicates the close relationship between the role the shop played in producing and storing templates, patterns and molds, the role of the Foundry in producing castings and fittings, all used in ship repair activities in Drydock #1.

From "Normalcy" to World War II

During the 1920's and 30's was an era of naval disarmament as the nation "returned to normalcy" and isolation from international affairs. During this period the Shipyard was the only west coast facility capable of servicing the capital ships of the Pacific fleet. By the mid-1930's the gathering of storm clouds over Europe and Asia saw an increase in funding for military preparedness and subsequent shipbuilding activity. One of President Franklin Roosevelt's first acts in office was the signing of Executive Order 6174 allocating \$238 million in National Recovery Administration funds for ship construction, which increased shipbuilding and repair activity at the Shipyard.

When Japan attacked Pearl Harbor the Puget Sound Naval Shipyard was only one of two naval yards on the West Coast which was fully operational. It was, in addition, the only battleship repair yard on the Pacific Coast. The Shipyard became the principal repair establishment for war-damaged battleships and aircraft carriers as well as smaller warships of the Pacific fleet. (Five of the eight battleships bombed at Pearl Harbor were repaired at the Yard.)

The pattern shop was an essential element of World War II ship repair and building activity at the Shipyard. The structure was an integral element of the flow of parts and materials used to repair and construct ships during World War II. The patterns and molds developed during ship overhauls in the 1920's and 30's were stored in Building 59 and used to expedite the repair of ships damaged at Pearl Harbor.

PHYSICAL DESCRIPTION

Original plans and construction

While the two story original structure had three story additions to the north in 1904 and 1922, they (especially the 1904) are architecturally compatible (and in scale) with the original building. The southern one-third of the structure defines an architectural element that is stylistically cohesive and of prominent scale, given its location near similar brick structures on Farragut Avenue. While construction plans date as early as 1897, most of the existing plans are of the 1922 addition (northern third of the building) that is constructed of reinforced concrete (the 1896 and 1904 additions are brick). Buildings 97 and 348 were demolished to make way for the 1922 addition.

Alterations and additions

The 1904 addition is of similar brick construction with identical multi-lite, double hung sash arched windows. The 1922 addition is of reinforced concrete construction with multi-pane industrial windows and a roof "penthouse" in the rear.

The second story arched center multi-pane casement window located on the front (south) facade is boarded over. On the first floor the original four leaf, multi-pane door was replaced with an industrial style roll-up metal door.

Architectural character and condition of the fabric

The building's heavy brick masonry walls with neo-Renaissance/classical detailing and steel truss gabled roofs represent an industrial building type prevalent in the Shipyard at the turn of the century. (The 1922 addition is of reinforced concrete and representative of the industrial style prevalent in the Shipyard during the 1920's and 30's.)

The Pattern Shop is 340 feet by 60 feet. It is two stories at the southern third of the building and three stories at the remainder, with a total square footage of 59,198 feet. The building is constructed of common running bond brick. The exterior brick is detailed with a series of brick pilasters with capitals. The northern third of the building is concrete detailed with concrete pilasters.

The building has double leaf, multi-pane, wood doors/doorways on the east elevation. Above the doors are semi-circular and flat arched, multi-pane windows (transoms).

The brick portion of the building contains large double hung sash windows with concrete lugsills and semi-circular arches

at the heads. Distinctive brick semi-circular "relieving arches" are located above the heads. The lower sash has 20 over 20 lights while the upper sash has 12 over 12. Multi-pane industrial windows situated between concrete pilasters characterize the concrete northern third of the building.

The building has a medium pitched gable roof with a distinctive parapet situated along the roof line on the 1904 addition. A continuous brick and metal cornice is situated along the roofline.

The building is in poor condition, especially the south two-thirds of the structure having suffered damage (extensive cracking of masonry bearing walls) in the 1949 and 1965 earthquakes. The poor condition of the mortar is allowing extensive moisture penetration into the building.

Description of Interior

The first floor consists of pattern shops and machinery, and general offices. The second and third floor are used for storage of patterns, molds and models. The first and second floor have basic utilitarian, industrial wall and ceiling finishes. On the third floor a distinctive brick wall separates the original (1896) building and the 1904 addition. A decorative segmental relieving arch is situated above the wall's doorway. Other decorative features include the posts/columns that support the first floor ceiling in the pattern making shops.

Mechanical equipment

Located on the first floor in the northern third (1922 addition) of the building are the shops that include several vintage pattern making pieces of equipment that date from the World War II era, and possibly earlier. related to the ship repair effort during the conflict. They include a belt-driven post (Bull) lathe with a large circular wooden face plate, built by the Oliver Machinery Company of Grand Rapids, Michigan. A 24 inch jointer in the shop was also manufactured by the Oliver Machinery Company. Another lathe adjacent to the post lathe was manufactured by the Yates-American Machine company of Beloit, Wisconsin. The lathes and jointer assist in shaping the final wood patterns.

The rest of the shop equipment is typical wood working equipment that dates from the post-World War II era.

Pattern-making process

Pattern making is an art as old as the art of metalcasting, and is an integral component of the foundry industry. Pattern making has been performed since 1899 at the Shipyard. Pattern materials used include wood, metal, plaster, fiberglass and plastic. Current improvements in production methods in the Pattern Shop include CNC lathes, a new five axis router, computer aided design software, and a system for coordinate measuring (PSNS 1992).

The pattern maker constructs the pattern required to make the mold (or templates, models, or mock-ups) for casting of any material for use in ship construction fittings. An example are mock-ups, which are imitations of a ship's hull, to which the pattern is constructed to secure the required shape.

The pattern maker must have complete and comprehensive knowledge of the principles of foundry practices, molding, and core-making. Before beginning the construction of a pattern, the method of molding must be decided. Since the pattern is imbedded into a sand mold to form the impression into which molten metal is poured, provisions must be made to withdraw the pattern from the sand. To loosen the impacted pattern, the molder jars it so that it can be withdrawn from the mold.

One type of pattern is molded in a wood or metal frame known as a "flask". The flask is made up of two parts, the lower half being designated as the "drag" and the upper half, the "cope". The drag and cope are accurately located together by means of flask pins, which allow the cope and drage to be separated to draw the pattern from the mold. The impression of the pattern is now incorporated in the body of the mold; the gate or "sprue" is through which the molten metal enters the mold cavity.

To make a casting of the desired dimensions, "shrinkage" must be considered. Skrinkage is the amount the pattern is made over-size to allow for the contraction of metal as it cools and solidifies in the mold. One of the first things to consider when a pattern is constructed is that certain allowances must be made on the pattern to compensate for changes in the properties of the metal after it is poured in the mold and while it cools to normal temperatures. These conditions usually alter the size of the casting and in many cases the stresses and strains, set up as the metal solidifies and cools, cause the casting to warp or twist sufficiently to materially alter its shape.

After the pattern is made it goes to the foundry where the mold is produced, either a one-of-a-kind type or in high volume amounts.

Other options to building pattern equipment include the fabrication of models and mock-ups for use in design department project work. Plexiglas components are also fabricated and machined on a regular basis.

SOURCES OF INFORMATION

Architectural Drawings

Drawings and construction plans are located in the files of the Public Works Department, Puget Sound Naval Shipyard, Bremerton, Washington.

Historic Views

Historic photographs are located at the Photography Laboratory, Puget Sound Naval Shipyard, Bremerton, Washington.

Interviews

Birkenfield, Isabel. Long-time resident, Bremerton, Washington (Father was Harry Keith, former pattern maker at Puget Sound Naval Shipyard), November 1993.

Foxall, Horace. Historian, U. S. Army Corps of Engineers, Seattle District, Seattle, Washington, October-December 1993.

Gallacci, Caroline. Historian, Historic Overview for the 1985 Historic Survey of Puget Sound Naval Shipyard, and 1986 National Register of Historic Places Nomination forms for Puget Sound Naval Shipyard, Tacoma, Washington, November 1993.

Grulich, August Gene. Architect, Grulich Architecture and Planning Services, 1985 Historic Survey of Puget Sound Naval Shipyard, and 1986 National Register of Historic Places Nomination forms for Puget Sound Naval Shipyard, Tacoma, Washington, November 1993.

Gundlach, H. F. Former pattern maker, Puget Sound Naval Shipyard, Bremerton, Washington, November 1993.

Khadem, Kira. Historic Preservation Officer, Puget Sound Naval Shipyard, Bremerton, Washington, October-December 1993.

Melson, Gene. Pattern maker, Puget Sound Naval Shipyard, Bremerton, Washington, October-November 1993.

Bibliography

Grulich Architecture and Planning Services. Historic Survey of Puget Sound Naval Shipyard, Bremerton, Washington. (Historic Overview and Puget Sound Naval Shipyard Historic Inventory Forms, Building 59) Tacoma, Washington, 1985.

Grulich, August Gene and Caroline Gallacci, Grulich Architecture and Planning Services. National Register of Historic Places Nomination Forms -- Puget Sound Naval Shipyard, Bremerton. Tacoma, Washington, 1986.

McFee, E. J. and R. G. Wagner. The Pattern Makers Manual. Bremerton: Industrial Relations Division, Puget Sound Naval Shipyard, 1946.

Navy Yard Puget Sound. Draft, National Register of Historic Places Nomination Form -- National Historic Landmark, Puget Sound Naval Shipyard, no date.

Puget Sound Naval Shipyard. Manufacturing Information -- Foundry, Pattern, Forge, and Propeller Repair Shops. Puget Sound Naval Shipyard, December 1992.

Reh, Louise M. Fifty Dollars An Acre, A History of the Puget Sound Naval Shipyard, 1891 to 1916. Bremerton: Red Deer Press, 1893.

Fair Winds of Change, A History of Puget Sound Naval Shipyard, 1916 to 1941. Bremerton: Red Deer Press, 1984.

Reh, Louise M. and Helen Lou Ross. Nipsic to Nimitz -- A Centennial History of Puget Sound Naval Shipyard. Bremerton Printing Company, 1991.

Thompson, Erwin N. National Register of Historic Places Nomination Form -- National Historic Landmark Puget Sound Naval Shipyard, World War II in the Pacific. Denver: National Park Service, Denver Service Center, 1984.

U. S. Navy. Annual Reports of the Navy Department, Reports of the Secretary of the Navy, Miscellaneous Reports, 1897-1915. Washington, Government Printing Office.